ARCH A158: BIM PROJECT INTEGRATION

Item	Value
Curriculum Committee Approval Date	12/04/2024
Top Code	020100 - Architecture and Architectural Technology
Units	2 Total Units
Hours	54 Total Hours (Lecture Hours 27; Lab Hours 27)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	No
Basic Skills	Not Basic Skills (N)
Repeatable	No
Open Entry/Open Exit	No
Grading Policy	Standard Letter (S)

Course Description

This course uses Building Information Modeling (BIM) in conjunction with prototyping and manufacturing software (such as Fusion 360 or FrameCAD) to integrate design, construction, and manufacturing applications for a small project. Autodesk Revit, Fusion 360, FrameCAD Structure and/or other software will be used in a collaborative team environment. ADVISORY: ARCH A156. Transfer Credit: CSU.

Course Level Student Learning Outcome(s)

1. Students will be able to prepare a BIM model for prototyping or construction using advanced manufacturing devices with software such as Fusion 360, FrameCAD, or similar at a project assistant level, as evaluated by the instructor.

Course Objectives

- 1. Integrate BIM models into prototypes for fabrication and construction using integrative software for manufacturing (Fusion 360, FrameCAD, or similar).
- 2. Implement structural and integrity testing for a design using digital tools (Fusion 360, FrameCAD Structure, or similar).
- 3. Prepare digital files for prototyping or manufacturing of a design using advanced manufacturing devices.

Lecture Content

Design Modeling Uploading and reviewing design models Preparing a model for testing and fabrication Coordinating and exporting relevant data Workflow and file formats Testing and Integrity Analyzing models for data integrity Diagnostic file testing programs Performance testing Load testing a virtual model Analysis reporting and documentation Prototyping Manufacturing Devices and File Integration 3-D printing additive 3-axis (CNC, water jet, laser, plasma, etc.) 5+ axis (CNC, robotics, etc.) Extruders (FrameCAD, etc.) File types and conversions Simulations and Efficiency Software simulations Tools Toolpaths Material coordination Speed and workflow Safety Prototyping and Manufacturing Equipment integration Material handling Tolerance Environment Air quality Workcell, protection Industrial Safety standards Site visits, manufacturing parts as appropriate to project, and participation in sample runs on equipment as available.

Lab Content

Design Modeling Activities Uploading and reviewing design models Preparing a model for testing and fabrication Coordinating and exporting relevant data Conversion of file formats Testing and Integrity Analyze models for data integrity Diagnose files Performance test design Load test design Generate reporting and documentation Manufacturing Devices and File Integration View devices Site visit to fabrication sites Prepare files for device(s) Simulations and Efficiency Run Software simulations Select tools and test Optimize files for manufacturing Prototyping and Manufacturing Observe a range of different devices Prepare files for a device Fabricate a sample, test file Optimize and troubleshoot outcomes

Method(s) of Instruction

- Lecture (02)
- DE Live Online Lecture (02S)
- DE Online Lecture (02X)
- Lab (04)
- DE Live Online Lab (04S)
- DE Online Lab (04X)

Instructional Techniques

Lecture and in-class assignments, projects, quizzes, individual and small group activities and instruction, field visits and observation of equipment on campus.

Reading Assignments

Students will spend a minimum of one hour per week reading software and equipment documentation as prescribed by instructor

Writing Assignments

Writing for this course only includes minor notations and short professional descriptors. Critical thinking is reinforced in the act of designing and coordinating a project for fabrication.

Out-of-class Assignments

Students will spend a minimum of 2 hours per week completing models, prototypes, and researching materials and tooling information.

Demonstration of Critical Thinking

Critical thinking is reinforced in the act of preparing and coordinating this project for manufacturing.

Required Writing, Problem Solving, Skills Demonstration

Writing for this course only includes minor notations and short professional descriptors.

Eligible Disciplines

Architecture: Any bachelor's degree and two years of professional experience, or any associate degree and six years of professional experience. Architecture: Any bachelor's degree and two years of professional experience, or any associate degree and six years of professional experience.

Other Resources

1. Instructor handouts and current software reference book as recommended by instructor.